



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Applicants:	Christopher C. Jung)	Confirmation No.	5099
	Richard A. Buck)		
Serial No.:	09/827,135)	Art Unit:	2615
)		
Filed:	April 05, 2001)	Examiner:	LONG,
)		HEATHER R
For:	APPARATUS FOR FACILITATING)		
	VIEWING BY HUMAN EYE)		

DECLARATION OF CHRISTOPHER C. JUNG UNDER 37 C.F.R. § 1.131

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

1. I, Christopher C. Jung, do hereby declare as follows:
2. I am an inventor on the above-referenced patent application.
3. I submit this Declaration in response to rejection of certain claims of the subject application based upon U.S. Patent No. 6,384,863 to Bronson for Ergonomically Designed Digital Camera Capable of Being Held by One Hand (Bronson).
4. Attached hereto are pages 1-19 from my inventor's notebook. The pages are a description of the subject invention, which I wrote into my notebook. My signature appears on each page of the attachment.
5. Pages 1-7 of the attachment were written by me on September 16, 2000. Pages 8-14 of the attachment were written by me on September 17, 2000. Pages 15-19 of

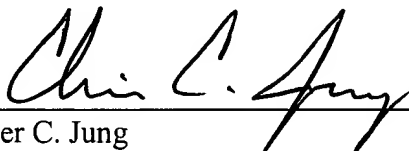
the attachment were written by me on September 18, 2000. All pages of the attachment were witnessed by Richard Buck on September 28, 2000.

6. As the attachment indicates, pages 1-19 were written by me prior to the filing date of the Bronson patent, i.e., prior to October 11, 2000.

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct.

Executed this 7TH day of OCTOBER, 2004, at LAGUNA HILLS, California.

Date: 7-OCT-2004



Christopher C. Jung

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE Technology Center 2600



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DECLARATION OF RICHARD BUCK UNDER 37 C.F.R. § 1.131

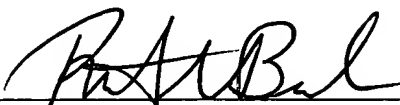
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Madam:

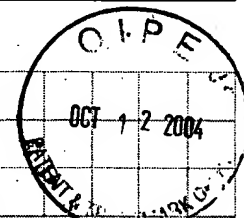
1. I, Richard A. Buck, do hereby declare as follows:
2. I am an inventor on the above-referenced patent application.
3. I submit this Declaration in response to rejection of certain claims of the subject application based upon U.S. Patent No. 6,384,863 to Bronson for Ergonomically Designed Digital Camera Capable of Being Held by One Hand (Bronson).
4. Attached hereto are copies of pages 1-19 from an inventor's notebook maintained by co-inventor Christopher C. Jung.
5. I witnessed the existence of those pages, and signed as a witness to the existence of those pages on September 28, 2000. My signature appears on each page of the attachment.

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct.

Executed this 7 day of October, 2004, at Laguna Hills,
California.

Date: 10/7/04 
Richard Buck

DATE 16-SEP-2000	EXP. NUMBER	EXPERIMENT HANDHELD VIEWING/READING AID	LAB PARTNER WITNESSED + UNDERSTOOD	LOCKER NUMBER
NAME Chin C. Amy		16-SEP-2000	9/28/00	

HANDHELD VIEWING/READING AID

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INTRODUCTION:

WITH THE GREAT NUMBER OF PERSONS NOW EXPERIENCING LOW VISION, AND EVEN MORE EXPECTED TO JOIN THIS GROUP AS THE "BABY BOOM" GENERATION MATURES INTO THEIR 70'S AND 80'S, THERE IS A NEED FOR A VISION ENHANCEMENT DEVICE, PREFERABLY A LIGHTWEIGHT, BATTERY-OPERATED, HANDHELD VIEWING AND READING AID THAT WOULD BE AS SIMPLE AND STRAIGHTFORWARD TO USE AS AN ILLUMINATING MAGNIFYING GLASS YET WOULD PROVIDE A WIDE RANGE OF FUNCTIONALITY TO THE OPERATOR, IT IS THIS PRODUCT CONCEPT THAT IS THE SUBJECT OF THIS NOTEBOOK ENTRY.

THE PROBLEM:

A PERSON WITH LOW VISION - DUE TO AGE-RELATED MACULAR DEGENERATION OR OTHERWISE - CAN HAVE DIFFICULTY WITH VIEWING IMAGES CONTAINING FINE DETAIL OR NON-CONTRASTING COLORS, SUCH IMAGES CAN BE ON A PRINTED PAGE, BUT MANY TIMES ARE ON OTHER SURFACES THAT ARE PART OF 3-DIMENSIONAL ITEMS AND PERHAPS ARE NOT EVEN FLAT, SUCH AS CEREAL BOXES, PRESCRIPTION DRUG LABELS, OR ANY OF THE VARIETY OF CONTAINERS THAT CAN BE ENCOUNTERED IN A TYPICAL HOUSEHOLD - FROM MILK CARTONS TO CANS OF SOUP, FROM MOUTHWASH BOTTLES TO LIQUID DRAIN CLEANER,

DATE 16-SEP-2000	EXP. NUMBER	EXPERIMENT HANDHELD VIEWING/READING AID	2
NAME Chris C. Gray	16-SEP-2000	LAB PARTNER [Signature]	WITNESSED & UNDERSTOOD 9/28/00 LOCKER NUMBER

ALTHOUGH LOW VISION IS ONE PROBLEM TO BE REMEDIED, THERE ARE OTHERS. A SECOND HINDERANCE TO BEING ABLE TO EFFECTIVELY VIEW AN OBJECT IS LACK OF ADEQUATE LIGHTING. EVEN PERSONS WITH AVERAGE VISUAL ACUITY CAN EXPERIENCE DIFFICULTY IN SEEING OBJECTS/TEXT CLEARLY WHEN LIGHTING IS INADEQUATE (EG. - TELEPHONE BOOKS OR MENUS IN A DIMLY-LIT RESTAURANT, MAGAZINES ON AN AIRPLANE, PROGRAMS AT A SCHOOL PLAY, ETC.). PERHAPS ONE PERSON DESIRES TO READ IN BED AT NIGHT WHILE THEIR PARTNER WANTS TO SLEEP. THIS SITUATION CAN BE ADDRESSED BY THE PRODUCT DESCRIBED HEREIN

ANOTHER PROBLEM TO BE REMEDIED IS RELATED TO IMAGE STABILIZATION WHEN HANDHELD VISUAL AIDS ARE APPLIED. FOR A TYPICAL MAGNIFYING GLASS, THE IMAGE WILL SHIFT LEFT AS THE HAND HOLDING THE MAGNIFYING GLASS MOVES RIGHT, AND VICE-VERSA. A REPRESENTATIVE 3" DIAMETER MAG GLASS CAN CREATE AN APPARENT SHIFT OF UP TO 0.5" IN THE IMAGE. THIS CAN BE QUITE DISTRACTING WHEN THE MOVEMENT IS ALL IN THE HORIZONTAL, BUT IS EVEN MORE TROUBLESOME IF THERE IS EVEN A SLIGHT VERTICAL COMPONENT. BECAUSE MOST USERS WILL TEND TO HOLD THEIR ARM AT A 45° ANGLE (OR SO) TO THE LINES WRITTEN IN A BOOK, ETC, INEVITABLY THERE WILL BE SOME VERTICAL MOVEMENT OF THE IMAGE WHICH CAN CAUSE A READER TO LOSE THEIR PLACE ON THE PAGE.

EXISTING OPTIONS:

THERE ARE A NUMBER OF OPTIONS AND PRODUCTS A PERSON CAN APPLY TO IMPROVE THEIR VISUAL EXPERIENCE AND WHICH EXIST TODAY, THESE ARE...

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NAME Chris C. Aug	16-SEP-2000	LAB PARTNER WITNESSED & UNDERSTOOD [Signature] 9/28/00	LOCKER NUMBER

... GIVEN HERE, IN NO PARTICULAR ORDER OF CONVENIENCE COST, EFFECTIVENESS, ETC., THESE HOWEVER ARE SOME OF THE ATTRIBUTES OF EACH APPROACH THAT ARE LISTED FOR COMPARISON WITH EACH OTHER AND AGAINST THE NEW PRODUCT CONCEPT DESCRIBED IN THE SECTION THAT FOLLOWS.

1.) STANDARD MAGNIFYING GLASS - PERHAPS THE MOST BASIC VISION-ENHANCING IMPLEMENT, THIS RATES HIGH IN THE FOLLOWING CATEGORIES:

- SIMPLE TO USE
- LOW COST (ABOUT \$5-10)
- VERY PORTABLE
- CLEAR IMAGE
- EASY MAINTENANCE

HOWEVER, THE STD MAG GLASS HAS A NUMBER OF NEGATIVE CHARACTERISTICS, AS FOLLOWS:

- GLASS IS HEAVY, BREAKABLE, CAN BE SCRATCHED
- IMAGE SHIFTS W/HAND MOVEMENT (LOSE PLACE ON PAGE)
- FIXED FOCAL LENGTH, FIXED ZOOM (MAGNIFICATION)
- PLACING GLASS OVER OBJECT OBSTRUCTS LIGHTING
- ONLY MAGNIFIES; NO COLOR/CONTRAST ENHANCEMENT

FIGURES 1 AND 2 BELOW SHOW EXAMPLES OF A STANDARD MAGNIFYING GLASS - ROUND AND RECTANGULAR

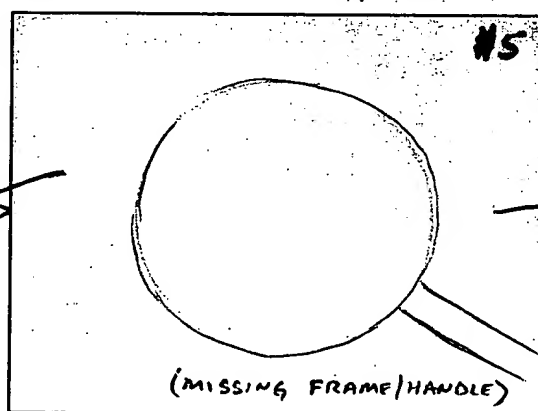


Figure 1 - Standard 2x circular (4" dia).

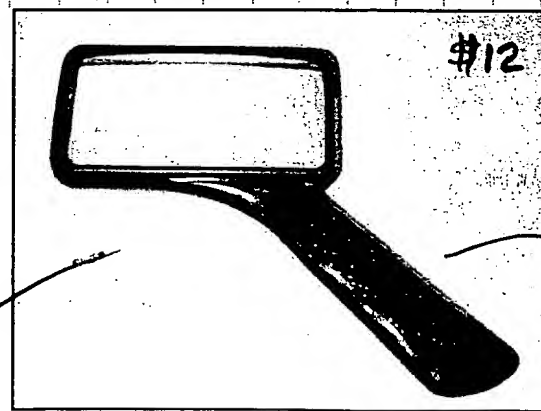


Figure 2 - Standard 2x rectangular (2x4").

DATE 16-SEP-2000	EXP. NUMBER	EXPERIMENT HANDHELD VIEWING/READING AID	4
NAME Chris C. Fry	16-SEP-2000	LAB PARTNER WITNESSED + UNDERSTOOD! <i>[Signature]</i> 9/28/00	LOCKER NUMBER

2.) MAGNIFYING GLASS W/BIFOCAL

FIGURE 3 IS AN EXAMPLE OF AN IMPROVEMENT OVER THE STANDARD MAGNIFYING GLASS BY INCLUSION OF A BIFOCAL ELEMENT WHICH SEEMS TO BE ALWAYS CIRCULAR, ABOUT 2X THE GAIN OF THE MAIN GLASS, AND ALWAYS IN THE PERIPHERY OF THE GLASS (I.E. - IN CORNERS IF A RECTANGLE, AT BOTTOM

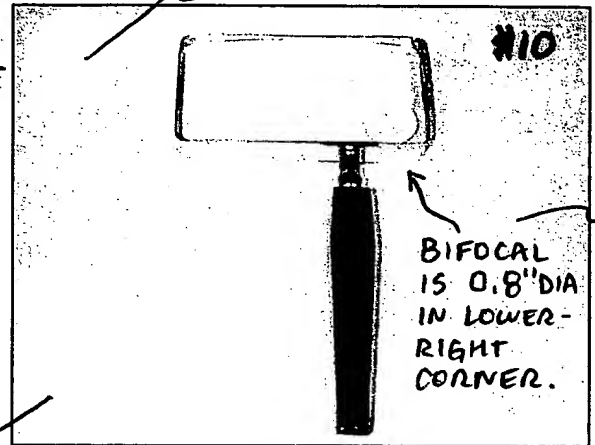


Figure 3 - 1.5x rectangular w/3x bifocal (2x4").

CENTER IF CIRCULAR OR SQUARE), WHICH IS WHERE THE MAIN GLASS IS THINNEST AND THEREFORE, A LIKEWISE THINNER ADDITIONAL GLASS LAYER (SOME APPEAR TO BE GLUED ON) CAN BE USED.

THIS EXTRA MAGNIFICATION CAN HELP IN READING FINE PRINT OR VIEWING DETAILS, BUT CLEARLY DOES NOT ALLOW FOR TAKING IN MUCH OF THE IMAGE AT A TIME. ALSO, IT WOULD BE NICER IF THE INCREASED GAIN WERE WAS ABLE TO BE POSITIONED INTO THE CENTER, TAKE ON A LARGER SIZE, AND TAPER OFF INTO THE OTHER MAGNIFICATION FACTOR VS. THE ABRUPT TRANSITION THAT OCCURS PRESENTLY.

AS AN ASIDE, THE PARTICULAR DESIGN OF FIG. 3 IS PECULIAR IN THAT THE HANDLE COMES STRAIGHT OUT THE BOTTOM (VS. AT A 45° ANGLE, WHICH IS MORE NATURAL, WHICH CAUSES THE USER TO CHOOSE BETWEEN POSITIONING THEIR HAND AT THEIR CHEST, TILTING THEIR HEAD AND THE READING MATERIAL, OR MISS USING THE FULL WIDTH OF THE RECTANGULAR GLASS. THE HANDLE ALSO WANTS TO TWIST FROM THE OFF-CENTER GLASS.

DATE	EXP. NUMBER	EXPERIMENT	
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NAME	16-SEP-2000	LAB PARTNER WITNESSED & UNDERSTOOD	LOCKER NUMBER
Chris C. Aug		Pat Bel 9/28/00	

3) MAGNIFYING GLASS W/ILLUMINATION

THE MAGNIFYING GLASS IN FIGURE 4 SOLVES THE PROBLEM WITH LOSING LIGHT DUE TO THE SHADOW OF THE MAGNIFYING GLASS FRAME, HANDLE, GLASS, AND USER'S HAND - SOMEWHAT!! LATER FIGURES WILL SHOW HOW THE LIGHT CAN BE FAIRLY UNEVEN, MISDIRECTED, AND INADEQUATE.

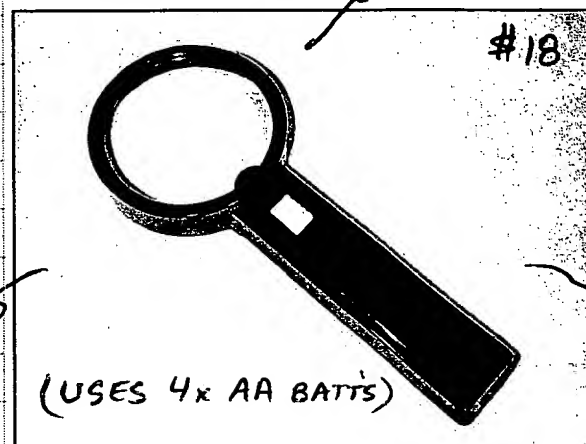


Figure 4 - 2.5x illuminated circular (3.5" dia).

THE MODEL SHOWN IN FIG. 4 HAD THE BEST ILLUMINATION OF ALL THE ILLUMINATED MAGNIFIERS EVALUATED. THIS IS PROBABLY DUE TO BOTH AN INCREASED ENERGY SOURCE (4x AA'S VS. 2x AA'S AND 2x AAA'S) AND AN OMNIDIRECTIONAL BULB VS. THE MORE POINT-SOURCE FOCUSED BULBS OF THE OTHERS.

4) MAGNIFYING GLASS W/ILLUMINATION AND BIFOCAL

OF COURSE, THE FEATURES OF FIGS 3 & 4 CAN BE COMBINED AS SHOWN IN FIGURE 5 AND FIGURE 6.

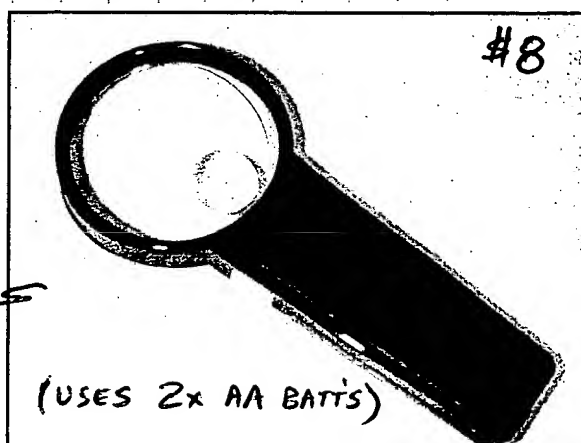


Figure 5 - 2x illum circ w/4x bifocal (3" dia).

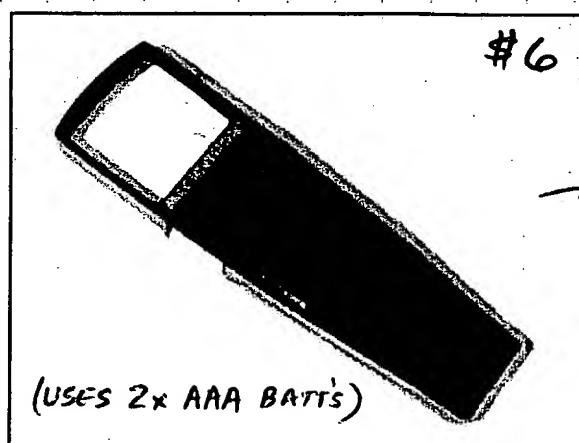


Figure 6 - 1.5x illuminated w/3x bifocal (1.5" sq).

DATE	EXP. NUMBER	EXPERIMENT	6
		HANDHELD VIEWING/READING AID	
NAME	16-SEP-2000	LAB PARTNER WITNESSED & UNDERSTOOD	LOCKER NUMBER
Chris C. Amy		9/28/00	

[ALL MAGNIFYING
GLASS OPTIONS] →

NOTE: THIS SECTION APPLIES TO ALL
OF THE MAGNIFYING GLASS OPTIONS
SHOWN IN #1-4 (p.3-5).

* AS FIGURES 7 THRU 10 SHOW BELOW, ACHIEVING A
UNIFORM ILLUMINATION OF THE SUBJECT MATERIAL
CAN BE CHALLENGING, EVEN WHEN THE MAGNIFYING
GLASS HAS ITS OWN SOURCE OF LIGHT. TYPICALLY
THERE IS ONLY ONE LAMP, POSITIONED AT BOTTOM
CENTER OF THE GLASS. FIGURE 7 AND FIGURE 8
SHOW HOW THIS LAMP CAN EMIT A POINT-SOURCE,
NARROW SOLID ANGLE OF LIGHT AND ONE THAT IS NOT
ALWAYS CENTERED. FIG. 9 SHOWS A MORE UNIFORM
ILLUMINATION, BUT THEN IN FIG. 10 THE PROBLEM...

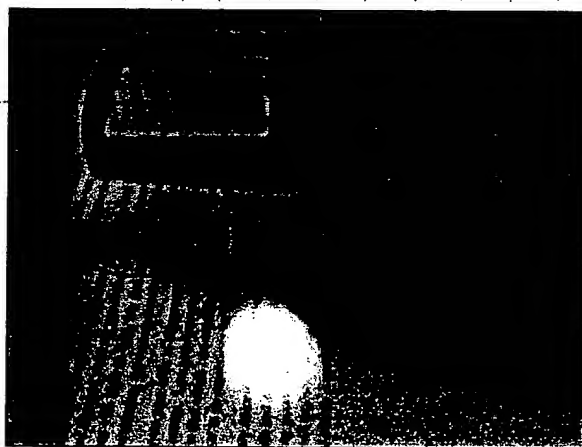


Figure 7 - Illumination is uneven, off-center.

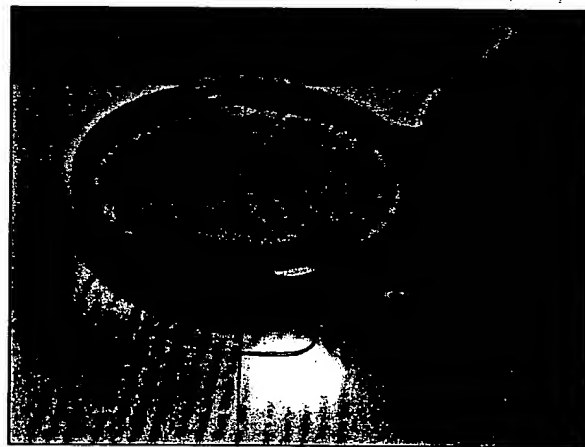


Figure 8 - Another example of poor illumination.

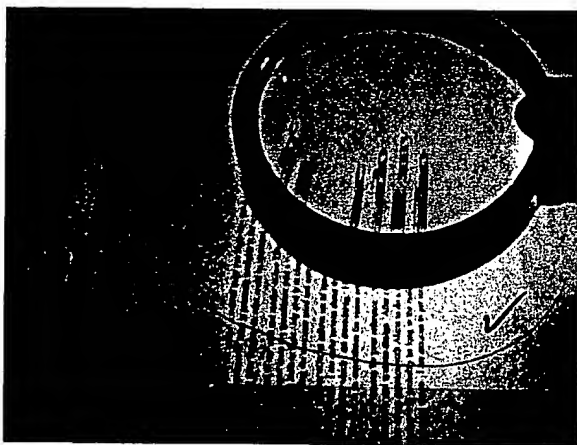


Figure 9 - Illumination is much more uniform.

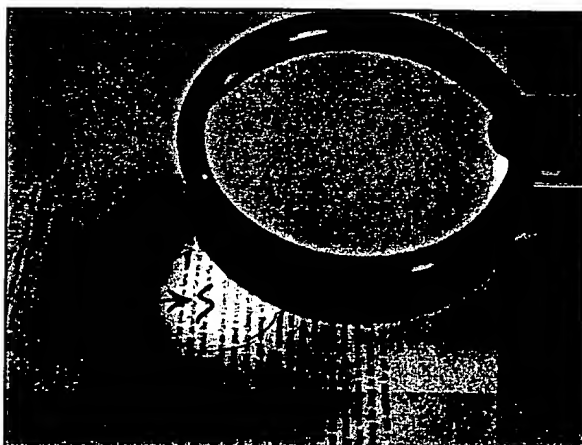


Figure 10 - Ambient light gets focused, is added.

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		HANDHELD VIEWING/READING AID	
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... OF ANY MAGNIFYING GLASS ALTERING AMBIENT LIGHT - BLOCKING IT, FOCUSING IT, ETC. - THEN ADDING THE RESULT TO THE LOCAL ILLUMINATION BECOMES EVIDENT (E.G. - SHADOWS OF FRAME, BRIGHT SPOT IN CENTER).

5.) MAGNIFYING GLASS OF HIGHER GAIN

FIGURES 1-6 SHOW MAGNIFYING GLASSES OF REASONABLE VIEWING AREA (TYPICALLY 8-10 SQUARE IN.) IN A VARIETY OF SHAPES & SIZES. ALTHOUGH SOME HAVE BIFOCAL MAGNIFICATIONS OF UP TO 5X, IN GENERAL THE MAIN ELEMENT HAS AN OPTICAL GAIN OF ABOUT 1.5X TO 2.5X (FIXED).

WHEN THE SUBJECT MATERIAL IS FLAT-SURFACED AND CONTAINS FINE PRINT OR OTHER DETAIL THROUGHOUT, OR IS OTHERWISE SUITED TO ITS USE, THE 6.5X "LINEN TESTER" DEVICE OF FIGURE 11 MAY BE USED.

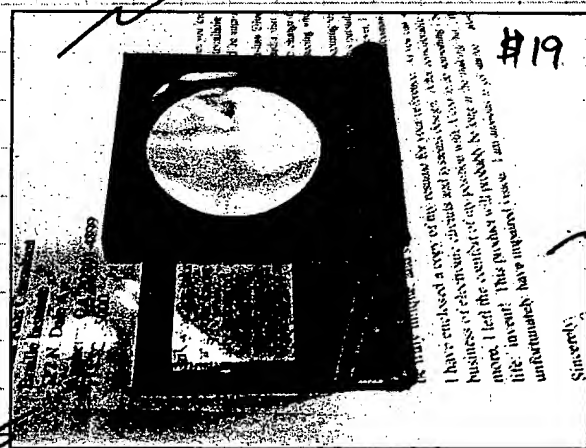


Figure 11 - 6.5x magnification, but a small area.

THIS DEVICE OFFERS THE MOST VISUAL GAIN OF ALL THE MAGNIFYING GLASSES TESTED, AND IT DOES SEEM EFFECTIVE FOR READING FINE TEXT, BUT ITS SHORTCOMINGS ARE VERY APPARENT AND CONSIDERATIONS FOR HIGH-MAGNIFICATION DEVICES IN GENERAL MAY BE GLEANED BY STUDYING THIS DEVICE.

ONE HANDY FEATURE OF THE 6.5X VIEWER IS THAT IT FOLDS TO A COMPACT 2.0" x 1.5" x 0.5" BY WAY OF...

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... THE HINGES EVIDENT IN FIG. 11 (THE LENS FOLDS BACKWARDS INTO THE VERTICAL SECTION FIRST, THEN THE STAND/FOOT FOLDS BACK ONTO THE LENS), ALSO, BY PROVIDING ITS OWN SUPPORT, IT GREATLY REDUCES EFFECTS OF HAND JITTER AND MAINTAINS PROPER FOCAL LENGTH AS THE OPERATOR SLIDES IT ALONG THE TEXT, ETC. TO BE VIEWED.

ALTHOUGH THE GLASS IN THIS VIEWER MEASURES 1.2" IN DIAMETER, THE IMAGE IS ONLY REALLY IN FOCUS AT THE CENTRAL 0.5" DIAMETER OR SO, WHICH AT 6.5x CORRESPONDS TO ABOUT A 0.1" DIAMETER AREA OF THE SUBJECT. FOR TYPICAL TEXT FONTS ON A TYPEWRITTEN PAGE, THIS IS EQUIVALENT TO A SINGLE LINE OR MAYBE TWO AT MOST. IN MATERIAL USED IN THIS EVALUATION (10-pt ARIAL FONT), THE MAXIMUM NUMBER OF LETTERS IN A LINE THAT COULD BE VIEWED AT A TIME WAS 7.

OTHER DISADVANTAGE IS THAT OF VIEWING ANGLE, WHICH IS QUITE LIMITED AS MAY BE EXPECTED FROM FIG. 11. UNLIKE THE LOWER-MAGNIFICATION AIDS OF FIGS 1-6, THE VIEWING ANGLE FOR THE 6.5x DEVICE IS LIMITED TO ABOUT 10% OFF VERTICAL (IN ANY DIRECTION), THUS, THE USER MUST POSITION THEMSELVES ESSENTIALLY DIRECTLY OVER THE DEVICE, WHICH CAN BE QUITE UNCOMFORTABLE ESPECIALLY FOR ELDERLY PEOPLE AND FOR EXTENDED LENGTHS OF TIME.

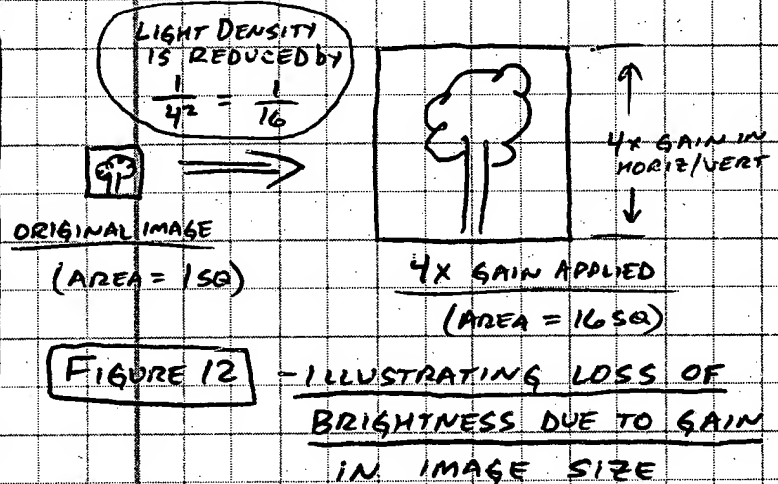
FINALLY, LIGHTING IS EVEN MORE CRITICAL WITH THE HIGH GAIN DEVICE. ONE REASON IS THE FRAME BLOCKS MORE AMBIENT AS IT IS CLOSER TO THE PAGE (AND, THE SIDE WALL THAT PROTECTS THE GLASS WHEN FOLDED IS SOLID). BUT THE MAIN REASON IS PROBABLY THAT,...

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1.) THE GAIN IN THE IMAGE SIZE HAS THE EFFECT OF REDUCING THE DENSITY OF THE LIGHT BY THE RECIPROCAL OF THE SQUARE OF THE GAIN, AS THE EXAMPLE BELOW ILLUSTRATES:

FOR MOST OF THE VIEWING AIDS HERE, A VISUAL GAIN OF $\sim 2x$ IS PROVIDED, WHICH SHOULD RESULT IN A BRIGHTNESS REDUCTION OF ABOUT 4:1, OR AN ENLARGED VIEW THAT IS ONLY

25% AS BRIGHT AS THE ORIGINAL, WHEN 4x GAIN IS APPLIED WITH SIMPLE MAGNIFYING GLASS METHODS, THE IMAGE INTENSITY IS $1/4^2 = 1/16 = 6.3\%$ THAT OF THE ORIGINAL OBJECT, AND WITH 6.5x OF THE HIGH-GAIN DEVICE OF FIG. 11, THE ATTENUATION IS $1/6.5^2 = 1/42.3 = \text{ONLY } 2.4\%$ OF THE ORIGINAL ILLUMINATION IS PRESENT IN THE VIEWED IMAGE (COULD IT POSSIBLY BE THIS LOW?).



BETWEEN LOSS OF ILLUMINATION AND DIFFICULTIES IN STABILIZING THE IMAGE, THERE DOES NOT SEEM TO BE AS MANY VIEWING AIDS WITH GAINS OF 3x OR HIGHER. HOW MUCH A PART THESE TWO FACTORS MIGHT PLAY IN THIS APPARENT MISSED MARKET OPPORTUNITY IS AT THIS TIME UNCLEAR.

6.) ELECTRONIC CAMERA AND SEPARATE VIDEO MONITOR

THIS FIRST OF A SERIES OF APPROACHES - WHICH EMPLOY ELECTRONIC CIRCUITRY TO AMPLIFY AND/OR MAGNIFY AND/OR MODIFY AN IMAGE - IS COMPRISED.

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... OF A DISTINCTLY-SEPARATED VIDEO CAMERA AND MONITOR AS SHOWN IN FIGURES 13 AND 14 BELOW.

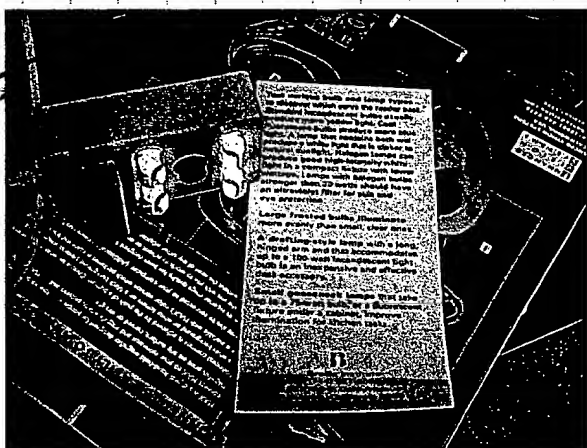


Figure 13 - A camera/monitor reading device.

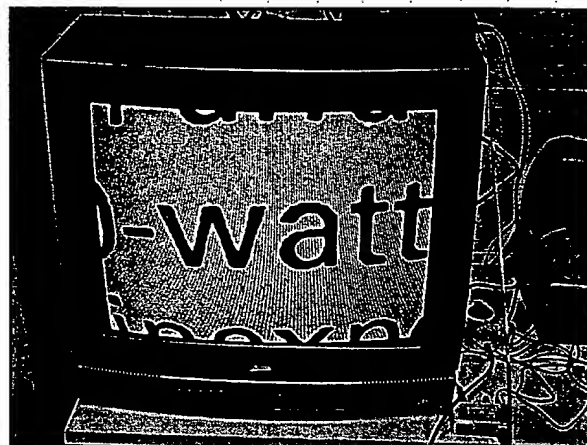


Figure 14 - Text magnified by device in Figure 13.

IN FIG. 13, THE CAMERA IS CONTAINED IN THE SMALL BOX WITH ILLUMINATION SOURCES AS SHOWN, AND THE MONITOR IS A TV-TYPE SCREEN/BOX THAT WOULD SIT ATOP A DESK, ETC. AS INDICATED IN FIG. 14, THE ADVANTAGE OF SUCH A MODULAR SYSTEM IS THAT THE CAMERAS ARE CCD-TYPE AND ARE RELATIVELY SMALL SO THEY CAN BE MADE MOBILE AS THEY TETHER TO THE MONITOR BY A VIDEO/POWER CABLE COMBINATION, THUS, THE CAMERA "HANDPIECE" CAN BE MANEUVERED OVER THE SUBJECT MATERIAL IRREGULARITIES, ETC. WHILE THE VIEWING UNIT - WHICH IS MUCH MORE BULKY + HEAVY - REMAINS RESTING A SHORT DISTANCE AWAY.

THE DISADVANTAGES OF THIS SYSTEM ARE MANY:

- EXTREMELY BULKY, NOT VERY PORTABLE
- REQUIRES AC POWER CONNECTION
- COMPLICATED CONNECTIONS/SETUP (?)
- OPERATOR MUST LOOK BACK + FORTH BETWEEN ACTUAL SUBJECT MATERIAL + VIEWED IMAGE
- COSTLY (SEE SAMPLE PRICES ON p.)

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		HANDHELD VIEWING/READING AID	
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2.) INTEGRATED CAMERA/MONITOR

IN FIGURE 15 ARE SHOWN ^{CA 9/17} ~~IS~~ EXAMPLES OF ELECTRONIC CCD CAMERA AND VIDEO MONITOR COMBINATIONS IN WHICH THE TWO ELEMENTS ARE CONTAINED IN A SINGLE HOUSING. THIS TYPE OF DEVICE HAS THE ADVANTAGE OF SIMPLIFIED SETUP, POSSIBLY A MORE-COMPACT SOLUTION, AND ALIGNMENT

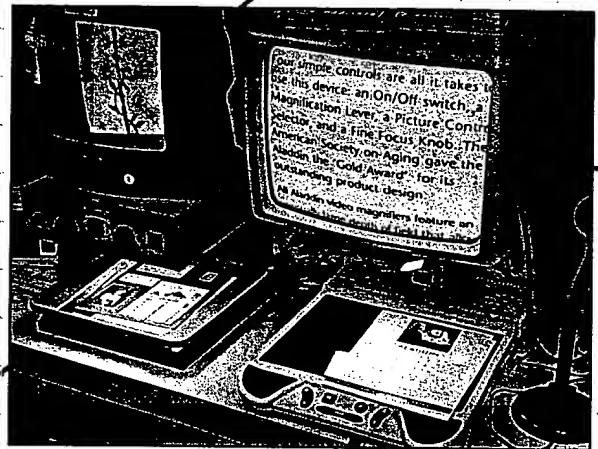


Figure 15 - Integrated platform-based devices.

OF THE ACTUAL OBJECT WITH THE ENHANCED IMAGE. PERHAPS THE PRIMARY DISADVANTAGE IS THAT THE CAMERA IS FIXED IN ITS ORIENTATION, AND SO THE OBJECT MUST BE BROUGHT TO THE VIEWING INSTRUMENT VS, INSTRUMENT-TO-OBJECT. THIS COULD BE A PROBLEM FOR LARGE ITEMS SUCH AS LABELS ON BOXES, NEWSPAPERS, ETC. OR ITEMS THAT OTHERWISE DO NOT LEND THEMSELVES TO THE POSITIONING REQUIRED FOR VIEWING BY THIS DEVICE.

ANOTHER DISADVANTAGE IS THAT AS LARGER ITEMS ARE VIEWED, THE MONITOR MUST BE RAISED UP (IF IT CAN) SO THE ITEM CAN FIT IN THE VIEWING SPACE. THESE DEVICES ARE CLEARLY FOR VIEWING READING MATERIAL PRIMARILY, AND THEIR LACK OF PORTABILITY LIMITS THEIR USE FOR EVEN THIS VERY RESTRICTED APPLICATION.

⇒ [COST OF SUCH ELECTRONIC VIEWING DEVICES]

... WHETHER SEPARATE AS IN FIG. 13/14 OR INTEGRATED AS IN FIG. 15, THE COST OF THESE APPROACHES IS MUCH HIGHER THAN A MAGNIFYING GLASS.

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SOME EXAMPLES OF SIMILAR DEVICES ALONG WITH MFG'S, PART/MODEL NUMBER, PRICE, AND BRIEF DESCRIPTION OF FUNCTIONALITY ARE AS FOLLOWS: (SOURCE IN "[xx]")

- MAGNISIGHT, INC. A.T. KRATTER & CO. 714-799-3000 (REP?)
[B/W BROCHURE ~ OCT 1999] 1X-50X MAG. ON 20" TV, BUILT-IN CONTRAST CONTROL, ROLLER STAND, FOCUS MANUALLY, "HOOK-UP TO YOUR TV", OPTIONAL DELUXE STAND FOR WRITING (NO PRICING)
- MAGNI-CAM by INNOVENTIONS INC LITTLETON, CO 303-797-6551
[PRICING] BROCHURE ~ OCT 1999 @ BRAILLE INST. IN BUENA PARK, CA]
INTRODUCED IN 1990, SEPARATE CAMERA/MONITOR, AUTO-FOCUS 6:1 ZOOM BY RAISING/LOWERING CAMERA, SPACER BLOCKS FOR STABILITY, MAG = 2X TV SCREEN SIZE TO $\frac{1}{3}$ X TV SIZE, HAS OWN ILLUMINATION, 70Z. CAMERA TOTAL WT., CONTRAST ADJ. KNOB AND POS/NEG IMAGE SWITCH. \Rightarrow OTHER VERSIONS INCLUDE HEAD-MOUNT DISPLAY (STILL HOLDING CAMERA UNIT) AND LCD 6 1/2" MONITOR (280Z-TOTAL SYSTEM=8LB), AC ADAPTER, BATTERY POWER PACK, CARRYING CASE, ETC.

PRICES:
(EFF. 1-MAY-1999)

TABLE 1

MAGNI-CAM BLACK + WHITE UNIT	... \$695
MAGNI-CAM COLOR UNIT	... 995
MAGNI-CAM HEAD-MOUNT UNIT	... 1200
MAGNI-CAM FLAT-SCREEN UNIT	... 1200
BATTERY PACK/CHARGER	... 600
EXTRA BATTERY (PORTABLE UNITS)	... 120

- ALADDIN Low Vision SOLUTIONS SUNNYVALE, CA 408-616-8700
OR REPS/DISTS @ ACCESSABILITY INC. 888-322-7200 or
WWW.4ACCESS.COM, AND TELESENSORY CORPORATION
SUNNYVALE, CA 408-616-8700 (SAME TEL#? AS ALADDIN
IT IS THE MODEL NAME, NOT THE COMPANY NAME?),

\rightarrow THEY HAVE NUMEROUS MODELS, ALL ARE TABLE-

DATE	EXP. NUMBER	EXPERIMENT	
		HANDHELD VIEWING/READING AID	
NAME	17-SEP-2000	LAB PARTNER	WITNESSED & UNDERSTOOD 9/28/00
Chris Amy			LOCKER NUMBER

...TOP MOUNTED, MOST HAVE INTEGRATED MONITOR AND MOST ARE BLACK & WHITE. NORMAL/INVERT TEXT (BLK on WHT) WHT on BLK) IS A COMMON FEATURE, MOST ALL UNITS ARE CRT TECHNOLOGY RUNNING ON UNIVERSAL (100-240V, 47-63Hz) AC INPUT, WEIGH 20-45 LB AND DRAW 50-100W. OTHER SPECIFIC FEATURES ARE GIVEN BELOW BY MODEL # ALONG WITH PRICE:

TABLE 2

MODEL	\$	BW/C	MAG. RANGE	DIAG"	ADDITIONAL FEATURES
ALC1A	1300	BW	2.8-17.5	9.0	BUILT-IN HANDLE, EXT. TV CONN.
VA2001	2500	BW	4.5-50.0	14.0	VERT/HORZ LINE MARKERS, SHDW MSK?
AL7A	2700	BW	4.5-50.0	14.0	HIGHER REFRESH RATE VS. VA2001
NX-7	2600	BW	5.4-60.0	17.0	"FEATHER-TOUCH" READING TRAY
→ GEP-1	3300	COLOR	5.5-50.0	—	MONITOR NOT INCL, USER-SEL TEXT BKGND
"NEWEST" PRODUCT RB-1	3000	COLOR	4.5-50.0	14.0	CAN SEL COLOR/BW "SEVERAL FGD/BGD"
RBP-1	3200	COLOR	4.5-50.0	14.0	LIKE RB-1 BUT COLOR/TINT ADJ.
GF1A	2200	COLOR	6.5-58.0	—	CAMERA ONLY, "VM600?"

- OPTELEC 800-231-7041 (NO OTHER CONTACT/PRICE INFO.) [BROCHURE ~ OCT 1999 @ BRAILLE INST. BP]. SEVERAL MODELS, ALL HAVE INSTANT FOCUS, ONE-TOUCH ZOOM, PUSH BUTTON BRIGHTNESS CTL, NORMAL/REVERSE TEXT CONTRAST MODES, POSITION LOCATOR, ADD'L FEATURES, BY MODEL #:

100 SERIES - LIGHTWEIGHT/PORTABLE, "BW TEXT ON YOUR TV"

300 SERIES - "CONNECTS TO YOUR TV", "FEATURES AN ERGONOMICALLY DESIGNED TABLE THAT FOR READING/WRITING, #312 HAS 17" B+W MONITOR, TILTS FOR VIEWING.

500 SERIES - FULL COLOR, VIEW ON EXT TV, #512 = W/COLOR MON.

700 SERIES - 800x600 COMPUTER-COMPATIBLE, SPLIT-SCREEN OPTION(?).

DATE	EXP. NUMBER	EXPERIMENT	14
NAME		17-SEP-2000	LOCKER NUMBER
Chris C. Long		LAB PARTNER WITNESSED & UNDERSTOOD	9/28/00

8.) WORD-RECOGNIZING "WAND"

ALL OF THE DEVICES THUS FAR HAVE BEEN "UNINTELLIGENT" IN THAT THEY SIMPLY AMPLIFY/MAGNIFY/CLARIFY/MODIFY AN IMAGE FROM THE SUBJECT MATERIAL - BE IT TEXT OR A B+W/COLOR GRAPHIC OR PHOTO - AND FORWARD IT TO THE OPERATOR FOR INTERPRETATION. IN CONTRAST, THE DEVICE SHOWN IN FIGURE 16:

THIS DEVICE IS ONE IN A FAMILY OF UNITS THAT ARE MADE BY SEIKO INSTRUMENTS (FOUND AT WWW.SKYMALL.COM), THIS PARTICULAR UNIT IS A #QT1000 "QUICKTIONARY"

THAT CLAIMS TO RECOGNIZE A WIDE RANGE OF FONT TYPES & SIZES AS THE USER SLIDES IT OVER THE WORD

IN QUESTION. THE UNIT SEEMS TO BE PRIMARILY SUITED FOR RECOGNIZING ONE WORD AT A TIME AND IN GIVING THE DEFINITION AND PHONETIC PRONUNCIATION. SOME OTHER MODELS ARE ABLE TO TRANSLATE FROM OTHER LANGUAGES (FRENCH, SPANISH, ITALIAN, ETC.) AND ALTHOUGH AN AD IN ~ APR-1999 AIRLINE MAGAZINE "SKYMALL" SHOWED A MODEL #QT2001EDD THAT WAS ABLE TO SPEAK THE SCANNED WORD, THIS MODEL DOES NOT SHOW UP ON THE WEBSITE NOR IS IT CLEAR WHETHER ANY OF THE 10-15 MODELS LISTED TRULY "SPEAK" THE SCANNED WORD. THE UNITS WEIGH 3OZ., RUN ON 3x "AAA" BATTERIES, AND RANGE IN PRICE FROM \$230-300.

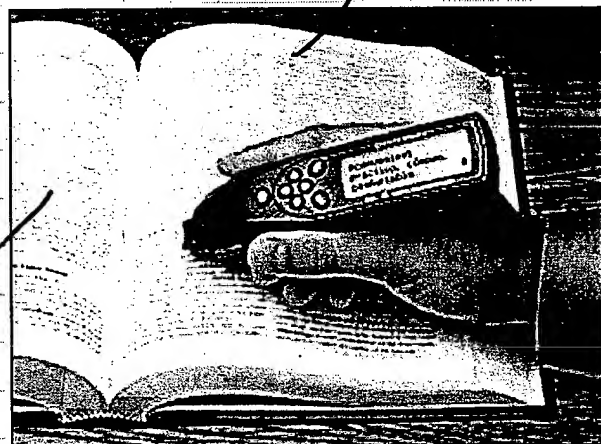


Figure 16 - A handheld word-recognizing device.

DATE	EXP. NUMBER	EXPERIMENT	
		HANDHELD VIEWING/READING AID	
NAME	18-SEP-2000	LAB PARTNER	WITNESSED + UNDERSTOOD
Chris C. Gray		Paul Bal	9/28/00
		LOCKER NUMBER	

NEW APPROACH/PRODUCT CONCEPT:

BETWEEN THE SIMPLICITY YET LIMITED FUNCTIONALITY OF THE MAGNIFYING GLASS AND THE POTENTIAL POWER (APPARENTLY YET-UNTAPPED) OF A DESKTOP SYSTEM, THERE IS A VAST MIDDLE GROUND THAT ^{IT} WOULD SEEM HAS NOT BEEN ADDRESSED BY THE MARKET. THE MAGNIFYING GLASS - WITH + WITHOUT ILLUMINATION - HAS NOT BEEN IMPROVED (NOR COULD IT BE, REALLY) OVER PRODUCTS THAT WERE AVAILABLE 30 YEARS AGO OR MORE. THE DESKTOP SOLUTION COULD DELIVER SUPERIOR IMAGE-PROCESSING PERFORMANCE, BUT IT SEEMS THE CURRENT OFFERING IS SIMPLY VIDEO CAMERA/MONITOR WITH SOME TRIVIAL ADJUSTMENTS FOR BRIGHTNESS/CONTRAST/COLOR AND ONLY A FEW MODELS OFFERING CHOICE OF FOREGROUND/BACKGROUND COLOR, OR POSITIVE/NEGATIVE "PROCESSING" FOR TEXT VIEWING. HOWEVER POWERFUL IT MAY BECOME, THE DESKTOP SOLUTION IS SIMPLY TOO BULKY AND COSTLY FOR EVERYDAY USE BY ALL THAT SUFFER FROM LOW VISION.

WITH ENABLING TECHNOLOGIES OF PCB-BASED COLOR CCD CAMERAS (AND B&W, BUT COLOR WILL EVENTUALLY BE LESS \$) AND COLOR LCD DISPLAYS (AGAIN, SAME \$ ISSUE AS CAMERAS) NOW EVOLVING INTO COMMODITY ITEMS, ALL THE INGREDIENTS ARE COMING TOGETHER FOR WHAT UNTIL NOW WOULD HAVE BEEN TOO COST-PROHIBITIVE TO CONSIDER: AN ELECTRONIC MAGNIFYING "GLASS".

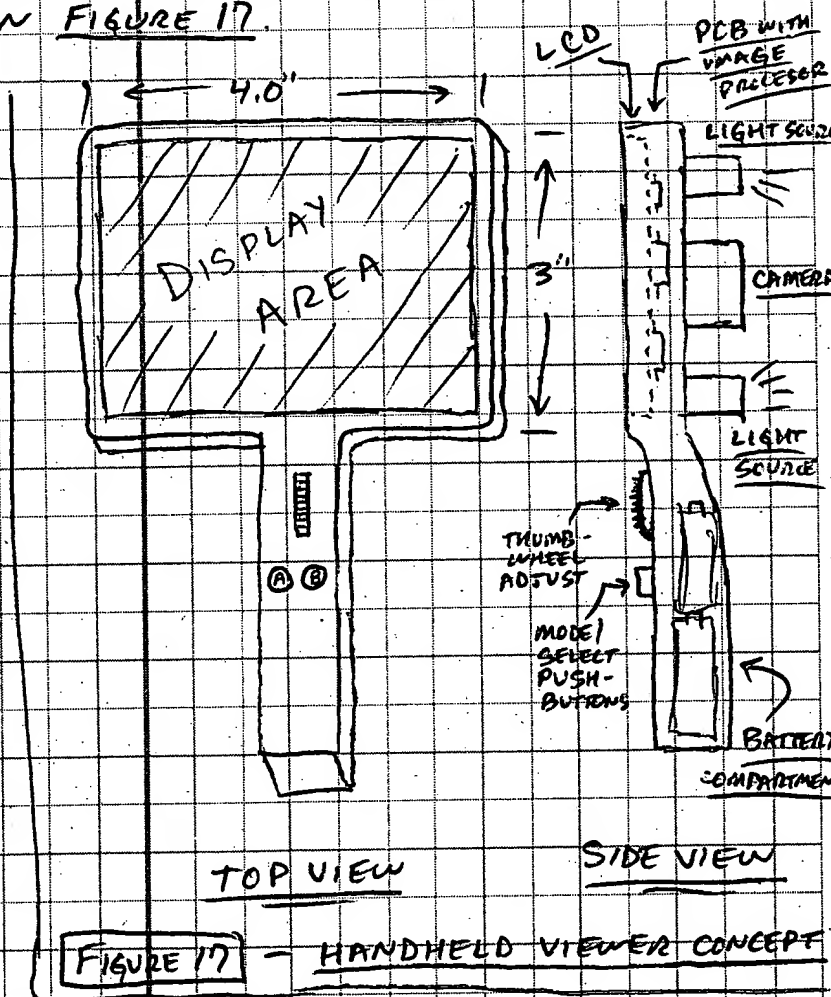
SUCH A DEVICE WOULD BE HANDHELD AND BATTERY-POWERED. IT WOULD HAVE A HANDLE (W/BATTERIES) AND A DISPLAY, WITH CCD CAMERA + AUTO-FOCUS MECHANISM (IF NEEDED) ON THE UNDERSIDE, ALONG WITH A LIGHT SOURCE (PREFERABLY INFRARED LEDs, WHICH DO NOT BOTHER OTHERS IN A DIMLY-LIT ENVIRONMENT AND PROBABLY DRAW LESS POWER + CAN BE PULSED VS. INCANDESCENT).

DATE	EXP. NUMBER	EXPERIMENT	16
NAME	18-SEP-2000	HANDHELD VIEWING/READING AID	
Chris C. Gray		LAB PARTNER WITNESSED & UNDERSTOOD	LOCKER NUMBER
		9/28/00	

A SKETCH SHOWING WHAT THIS HANDHELD VIEWER MIGHT LOOK LIKE IS SHOWN IN FIGURE 17.

THE DISPLAY IS A FULL-COLOR LCD OF APPROX. 3x4", THE CAMERA IS A COLOR PCB MOUNTED CCD TYPE, NOW IN USE FOR A HUGE NUMBER OF "WEB-CAM" TYPE PRODUCTS THAT SIT ATOP A PC FOR INTERNET-BASED VIDEO TELEPHONES.

THE FRAME HOLDS THE LCD ON ONE SIDE AND THE CAMERA/ILLUMINATION SOURCE ON THE OTHER, AND IN-BETWEEN THESE, A PCB WITH CIRCUITRY TO CAPTURE/PROCESS/STORE THE IMAGE. SEVERAL OPERATOR CONTROLS ALLOW FOR SIMPLIFIED USER INTERFACE.



1.) ENABLING TECHNOLOGIES

THIS VIEWING DEVICE WILL BECOME PRACTICAL FROM A PACKAGING/COST/PERFORMANCE STANDPOINT DUE TO MANY OF THE NECESSARY COMPONENTS UNDERGOING GREAT REDUCTIONS IN SIZE AND PRICE. THESE COMPONENTS INCLUDE THE FOLLOWING:

- CCD CAMERA ON-A-CHIP - PERHAPS NOT YET AVAILABLE AT LOW ENOUGH COST, CERTAINLY THE TREND...

DATE	EXP. NUMBER	EXPERIMENT	LOCKER NUMBER
		HANDHELD VIEWING/READING AID	
NAME	18-SEP-2000	LAB PARTNER WITNESSED & UNDERSTOOD 9/28/00	

... HAS BEEN FOR PCB-MT CCD CAMERAS TO FALL IN PRICE AS THEY MAKE THE TRANSITION FROM CAMCORDERS INTO "WEB-CAMS" TO MOUNT ATOP PCs. IN TIME, THE LARGE BASE OF PC AND SPECIFICALLY INTERNET TELEPHONE (W/CAMERA) USERS AND OTHER DIVERSE USES (RX CARS, TOYS, SECURITY CAMS, ETC.) WILL INEVITABLY DRIVE THE COST DOWN AND SIZE AS WELL, UNTIL A CAMERA-ON-A-CHIP WILL RUN \$5-10 FOR COLOR 240x320 PIXEL OR BETTER. HOPEFULLY, THIS TRANSITION WILL CARRY WITH IT A REDUCTION IN COST OF ASSOC. DECODER/DRIVER IC.

B.) LCD DISPLAY - THE OTHER PRIMARY COMPONENT IS THE DISPLAY. A COLOR LCD WITH FLUORESCENT BACKLIGHT IN 240x320 RESOLUTION AND 3-COLOR, 8-BIT DEPTH SHOULD BE ABOUT \$25 FOR THIS PRODUCT TO BE VIABLE, ALTHOUGH SOMEWHAT HIGHER MAY BE TOLERABLE IF A MONOCHROME MODEL AT \$25 DEM COST WAS AVAILABLE (COLOR VS. MONO SEEMS TO COMMAND CONSIDERABLY MORE AT RETAIL \$, SO LIKEWISE MORE IN RAW COST IS OK).

C.) DSP/PROCESSING IC'S - WILL BE NEEDED TO XFER THE IMAGE FROM CCD → LCD FORMATS, STORE IT, AND CONVERT IT FOR VARIOUS COLOR SHIFTS, GAINS, EDGE-DETECTION, ETC.

D.) BATTERY POWER MANAGEMENT - IC'S AND RELATED DEVICES TO EFFICIENTLY PRODUCE THE REQUIRED VOLTAGES FROM A SINGLE SET OF 2-4 AA BATT'S (eq) WILL BE NEEDED.

E.) MEMORY/INTERFACE IC'S - IMAGE STORING & XFERRING TO/FROM COMPUTERS, ETC. MAY BE DESIRABLE, AND THESE DEVICES WILL BE REQ'D.

DATE	EXP. NUMBER	EXPERIMENT	18
		HANDHELD VIEWING/READING AID	
NAME	18-SEP-2000	LAB PARTNER WITNESSED & UNDERSTOOD	LOCKER NUMBER
Chris C. Aug		Paul B. 9/28/00	

F.) OPTICAL CHARACTER RECOGNITION (OCR) - IC'S AND SOFTWARE ALGORITHMS REQ'D. TO DETECT CHARACTERS ARE BECOMING MORE AVAILABLE.

G.) VOICE TECHNOLOGY - PRIMARILY SYNTHESIS (VS. RECOGNITION), TO "READ" THE MATERIAL TO THE USER - IS ALSO MORE COMMON TODAY.

2.) UNIQUE FEATURES

WITH IMAGES AND TEXT IN DIGITAL FORMAT AS IS READILY THE CASE WITH CCD-BASED CAMERAS, A TREMENDOUS NUMBER OF POSSIBILITIES EXIST FOR FUNCTION AND PERFORMANCE OF A VISION AID SUCH AS THE DEVICE DESCRIBED HERE, INCLUDING:

A.) IMAGE OR TEXT PROCESSING/ENHANCEMENT

B.) IMAGE STABILIZATION

- AUTO FOCUS
- AUTO TRACK
- AUTO ZOOM
- FREEZE-FRAME/SHOT MODE
- NO MOVEMENT OF IMAGE OPPOSITE TO HAND MOTION

C.) COLOR-SHIFTING, AS REQ'D (COLOR BLINDNESS)

D.) BRIGHTNESS/CONTRAST ENHANCEMENT

E.) INTEGRAL, UNIFORM, INVISIBLE (IR?) LIGHTING @ NIGHT

F.) EDGE DETECTION, LINE DRAWING CONVERSION

G.) B+W/MAGAZINE/TEXT MODES (LIKE A SCANNER)

H.) WORD RECOGNITION, VOICE READS TO USER

I.) FLAT OR CURVED OBJECTS (TEXT ONLY)

J.) DON'T NEED TO BRING OBJECT TO UNIT (PORTABLE, LIGHTWEIGHT)

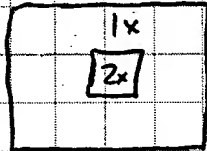
K.) SCROLL/PAN BUFFER FOR CURVED OBJECTS (PRES. MED'S)

L.) MEMORY - TO HOLD FAVORITE PIC'S, COMICS, ETC. (CAMERA SNAPSHOT)

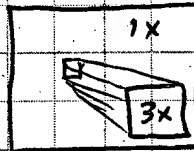
M.) VARIABLE (INTEGER OR CONTINUOUS?) ZOOM, BY THUMBWHEEL ON HANDLE.

DATE	EXP. NUMBER	EXPERIMENT	19
NAME	18-SEP-2000	HANDHELD VIEWING/READING AID	
Chin C. Fung		LAB PARTNER	LOCKER NUMBER
		WITNESSED	UNDERSTOOD
		9/28/00	

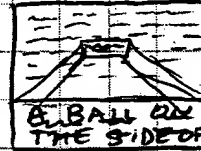
N.) SELECTABLE ZOOM - AREA SHAPE, POS'N, GAIN:



2x/4x/8x,
SIZE, LOCATION
ALL ADJUST



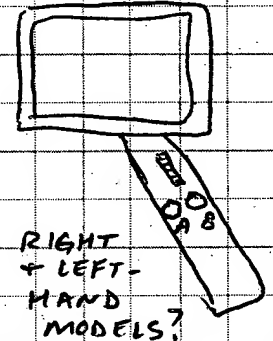
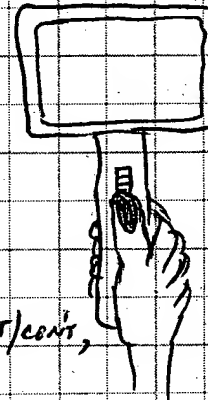
CONSTRUCTION
LINES SHOW
WHERE MAG
IMAGE ORIG'S.



WHOLE BAR
MODE (TEXT)

O.) EASE OF OPERATION :

- REDUCE MODES TO ONLY THOSE THAT WORK
- "A" PB SELECTS MODE
- "B" PB IS "ENTER"
- THUMBWHEEL FOR VARIABLE ZOOM, POSITIONING, BRIGHT/CONT, ETC.



P.) PROGRAMMABLE

- CUSTOM COLOR XFMATIONS, ETC.
- SETTINGS RETAINED ON POWER-OFF (FAVORITES, ETC)

RED	ORG	BRN	1	1	ACTUAL SUBSTITUT
BLU	GRN	BRN	1	1	

Q.) VARIABLE ZOOM

- GRADIENT OF ZOOM, TOWARDS CENTER
- NOT SURE HOW THIS WOULD BE PERCEIVED.

